

Remarks

Reconsideration is respectfully requested.

5 Claims 1-17, 21-27, 30, 32, and 34-57 are pending.

Claim 17 and 27 have been amended to describe the dye-based ink-jet ink composition as being in an aqueous solution. This is supported in the specification on page 7, lines 26-27. Furthermore, Claims 17 and 27 have also been amended to  
10 describe the cationic polyelectrolyte as being from 1000-10,000 molecular weight. No new matter has been added.

Claims 17, 21, 23-27, 32, 50, 52-55 and 55 stand rejected under 35 U.S.C. 102(a) as being anticipated by Watanabe.

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Watanabe discloses combining ink with underprinted cationic fixer fluid. In a preferred embodiment, the ink is a resin emulsion with water as a continuous phase and the resin component as a dispersed phase (Column 9, lines 44-46). In other words the resin component is not dissolved in the water, rather it is dispersed.

20 Specific examples of "water insoluble" thermoplastic resins used to form the resin emulsion are listed from Column 10, line 65 to Column 11, line 12.

In contrast, in the presently claimed invention, the ink in an aqueous solution comprises dye and anionic binder polymer. As an aqueous solution, both components of the ink are necessarily soluble in water, unlike the water insoluble thermoplastic resins in the ink of Watanabe.  
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Furthermore, Watanabe teaches that the underprinted cationic fixer fluid has cationic surfactants which include quaternary ammonium salts and derivatives thereof. Specific examples of quaternary ammonium salts ( $R_1R_2R_3R_4N^+X^-$ )  
30 are given in Column 7, lines 6-15, where  $R_1$  and  $R_2$  each independently represent a  $C_8$ - $C_{20}$  alkyl, benzyl, or phenyl group,  $R_3$  and  $R_4$  each independently represent a  $C_1$ - $C_4$  alkyl group and  $X^-$  represents a counter ion. At its largest, the quaternary

ammonium salts described in Watanabe are well under 1000 molecular weight.

5 In contrast, in the presently claimed invention, the cationic polyelectrolytes of the underprinted fixer fluid have a molecular weight in the range 1000-10,000, which is well above the possible molecular weight of the quaternary ammonium salts disclosed in Watanabe.

10 As evidence of the importance of having cationic polyelectrolytes of the underprinted fixer fluid which have a molecular weight in the range 1000-10,000, applicants submit herewith a Declaration signed by inventor Shirley Lee which presents results of experiments comparing underprinting fixer fluids with and without cationic polyelectrolytes (specifically styrene maleimide 1000i, a quaternary ammonium resin having MW from 5000-10,000) and their interaction with dye-based  
15 ink-jet ink. Specifically it was found that there was a significant improvement in optical density and smudgefastness of the ink-fixer interaction with the fixer fluid having the styrene maleimide 1000i. Improvement in those qualities relates directly to good film-forming qualities, i.e., formation of the amorphous, viscous film of the presently claimed invention.

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For the above reasons, the 102(a) rejection of Claims 17, 21, 23-27, 32, 50, 52-55 and 57 based on Watanabe should be withdrawn.

25 Claims 17, 23-27, 32, 52-55, and 57 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kurabayashi et al. or Takahashi et al., either of which in view of Watanabe et al. (U.S. 6,080,229).

30 Both Kurabayashi and Takahashi disclose a liquid composition which is a part of an ink set. This liquid composition has a cationic component of less than 1000 MW, which may be a quaternary ammonium compound (Kurabayashi: Column 5, line 33 to 38; Takahashi: from Column 5, line 67 to Column 6, line 9). In addition this liquid composition also includes a cationic component, which does not include a quaternary ammonium compound, the cationic component having a MW of from

1500 to 10,000 (Kurabayashi: Column 6, line 8 to 26; Takahashi: Column 6, line 32 to 37). Furthermore, both Kurabayashi and Takahashi disclose an ink having a water-soluble anionic dye. In addition, Kurabayashi discloses an alkali-soluble type resin in the ink.

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Combining Kurabayashi or Takahashi with Watanabe would neither suggest nor make obvious the presently claimed invention. Elements of the presently claimed invention lacking in Kurabayashi or Takahashi are neither provided nor suggested by Watanabe. Regardless of Watanabe's teaching about polyvalent metals in the  
10 fixer fluid, one skilled in the art, reading either Kurabayashi or Takahashi in combination with Watanabe, would not find suggested all the elements of the presently claimed invention. The quaternary ammonium compounds disclosed in both Kurabayashi and Takahashi are less than 1000 MW and are therefore distinguishably different than the larger cationic polyelectrolytes such as quaternary  
15 ammonium, having a MW of 1000-10,000, of the presently claimed invention. Kurabayashi, Takahashi or Watanabe neither teach nor suggest anything about the desirability or effectiveness of larger polyelectrolytes in achieving the amorphous, viscous fluid achieved in the presently claimed invention. Furthermore, none of them teach having anionic polymeric binders in the aqueous ink solution.  
20 Rather Watanabe and Kurabayashi (but not Takahashi) both teach a water insoluble anionic resin which forms an emulsion in the ink. These non-water soluble resins would not suggest the anionic polymeric binders of the aqueous ink of the presently claimed invention.

25 On the basis of the above amendments and arguments, the 103(a) rejection of 17, 23-27, 32, 52-55 and 57 based on Kurabayashi or Takahashi in view of Watanabe should be withdrawn.

Claims 30 and 56 stand rejected under 35 U.S.C. 103(a) as being unpatentable  
30 over Kurabayashi et al. or Takahashi et al. either of which in view of Watanabe et al. as applied to claims 17, 23-27, 32, 52-55, and 57 above, and further in view of Yatake.

Yatake teaches an ink and a fixer fluid. Specifically, Yatake uses polyethyle-  
neimine in the fixer fluid to react with the dispersed pigment. However, like Taka-  
hashi, Kurabayashi, and Watanabe, it teaches nothing about either cationic poly-  
electrolytes in the underprinted fixer fluid having a molecular weight in the range  
5 1000-10,000 or a cationic polymeric binder which is dissolved in an aqueous ink  
solution. As discussed above, these elements are not suggested by Takahashi,  
Kurabayashi and Watanabe alone or in combination.

For the above reasons, the 103(a) rejection of claims 30 and 56 based on Taka-  
10 hashi or Kurabayashi in view of Watanabe in further view of Yatake should be  
withdrawn.

In light of the above amendments and arguments, applicants respectfully request  
that the §§ 102(a) and 103(a) rejections be withdrawn.

15 A prompt and positive response is respectfully requested.

Respectfully Submitted,

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